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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,812	01/23/2004	C.P. Kelkar	4959	5008

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EXAMINER

SINGH, PREM C

ART UNIT	PAPER NUMBER
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1764

MAIL DATE	DELIVERY MODE
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07/02/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/763,812	Applicant(s) KELKAR ET AL.	
	Examiner Prem C. Singh	Art Unit 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Affirmation of election of claims 17-30 made by applicant is noted.
New abstract is noted.
Objection to claim 30 is withdrawn.
Amendment to claim 30 is noted.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:
 1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 17-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peters et al (US Patent 6,379,536) in view of Aubert et al (US Patent 6,214,306).

6. With respect to claim 17, Peters discloses a process for NO_x control in an FCC process by using a composition that comprises (i) an acidic oxide support, (ii) an alkali/alkaline earth metal, (iii) a transition metal oxide having oxygen storage capability, and (iv) a transition metal selected from Group I B and/or II B. (See column 1, lines 53-62). Peters further discloses a method of reducing NO_x emission during fluid cracking of a hydrocarbon feedstock into lower molecular weight components, said method comprising contacting a hydrocarbon feedstock with a cracking catalyst at elevated temperature whereby lower molecular weight hydrocarbon components are formed, said cracking catalyst comprising a NO_x reduction component of the invention (See claim 12, column 6, lines 22-40).

Peters does not disclose (i) mixed cerium and zirconium oxide in the NO_x reduction composition.

Aubert invention discloses a composition based on zirconium and cerium oxides and its use in NO_x reduction. Aubert further discloses that the composition comprises of (i) zirconium oxide and cerium oxide and it is provided in the form of pure solid solution of cerium oxide in zirconium oxide. (See column 1, lines 30-35). The invention further adds that the composition additionally contains (ii) a doping element chosen alone or a mixture from rare earth metals, alkaline earth metals, particularly lanthanum (See column 2, lines 47-57).

Aubert also discloses that the composition of the invention can be used in the catalysis of various reactions such as hydrodenitrification, cracking, hydrocracking etc. (See column 7, lines 50-60).

Since Peters and Aubert both inventions are disclosing a similar NO_x reduction composition in a catalytic cracking process, it would have been obvious to one skilled in the art at the time the invention was made to modify Peters invention and add (i) a mixed zirconium oxide and cerium oxide as suggested by Aubert into the composition of Peters for an enhanced NO_x reduction capability. See *In Re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980).

7. With respect to claims 18 and 19, Peters invention discloses, "The invention encompasses FCC processes using the NO_x reduction compositions of the invention

Art Unit: 1764

either as an integral part of the FCC catalyst particles themselves or as separate admixture particles in the FCC catalyst inventory.” (Column 1, lines 63-67).

8. With respect to claim 20, Peters invention discloses, “The said cracking catalyst is fluidized during contacting said hydrocarbon feedstock.” (Claim 13, column 6, lines 41-42).

9. With respect to claim 21, Peters invention discloses, “The method of claim 12 further comprising recovering used cracking catalyst from said contacting step and treating said used catalyst under conditions to regenerate said catalyst.” (Claim 14, column 6, lines 43-46).

10. With respect to claim 22, Peters invention discloses, “The method of claim 12, wherein said hydrocarbon feedstock contains at least 0.1 wt% nitrogen.” (Claim 15, column 6, lines 47-48).

11. With respect to claim 23, Peters invention does not disclose cerium and zirconium oxide contents.

Aubert discloses, “ Expressed in the form of oxides, the compositions according to the invention generally exhibit a Zr/Ce atomic ratio equal to or greater than 1.” (Column 3, lines 10-15). “According to other embodiment of the invention, the cerium proportion can be at most 20%.” (Column 3, lines 26-28). Thus, as discussed under

claim 17, it would have been obvious to one skilled in the art at the time the invention was made to modify Peters invention and use a Zr/Ce ratio as claimed, for a better NO_x reduction composition.

12. With respect to claim 24, Peters invention discloses, "The amount of transition metal present is 0.1-5 parts by wt per 100 parts of the oxide support material." (Column 3, lines 1-5).

13. With respect to claim 25, Peters invention discloses, "Preferably, the transition metal is selected from the group consisting of Cu, Ag and mixtures thereof." (Column 2, lines 66-67).

14. With respect to claims 26 and 27, Peters invention discloses, "The transition metal oxide having oxygen storage capability may be any transition metal oxide having oxygen storage capability similar to that of ceria." (Column 2, lines 47-49).

Since Peters suggests using any transition metal oxide similar to ceria and Aubert discloses using lanthanum as a doping element in the NO_x reduction composition as discussed under claim 17, it would have been obvious to one skilled in the art at the time the invention was made to modify Peters invention and use lanthanum oxide in place of ceria for similar performance in the NO_x reduction. Aubert further discloses, "Mention may more particularly be made of yttrium, lanthanum,

neodymium, praseodymium, europium, and samarium.” (Column 2, lines 55-57). See *In Re Ruff*, 256 F.2d 590, 118 USPQ 340 (CCPA 1958).

15. With respect to claims 28 and 29, Peters invention discloses, “The amount of NO_x reduction component in the additive particles is preferably at least 50 wt%.” (Column 3, lines 21-23).

16. With respect to claim 30, Aubert invention discloses in a preferred embodiment the weight ratio of the catalyst as: cerium oxide = 18, zirconium oxide = 72, lanthanum oxide = 5 and praseodymium oxide = 5 (See column 9, lines 64-67). This gives mixed oxide (i) in an amount of 90 wt%.

Double Patenting

17. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to

Art Unit: 1764

be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

18. Claims 17-30 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-9 of U.S. Patent No. 6,852,298. Although the conflicting claims are not identical, they are not patentably distinct from each other because the '298 claims have an acidic oxide support and only cerium oxide as one component. The present application does not claim an acidic support and claims a mixed oxide of cerium and zirconium. Since the support material does not play an active role in the NO_x reduction process during FCC operation, and since zirconium is a known element for catalytic NO_x reduction, it would have been obvious to one skilled in the art at the time the invention was made to modify the '298 claims to eliminate the acidic oxide support and include zirconium with cerium for an enhanced NO_x reduction.

Response to Arguments

19. Applicant's arguments filed 04/17/2007 have been fully considered but they are not persuasive.

20. The Applicant argues that Peters et al. does not disclose the use of a "mixed oxide of cerium and zirconium" as a NO_x reduction composition. Aubert invention "discloses a composition based on zirconium and cerium oxides." See Office Action at

page 6, first paragraph. However, there is no indication whatsoever in Aubert et al. that the zirconium and cerium oxide can be used as a NO_x reduction component in combination with an FCC catalyst. Even though Aubert et al. briefly discloses uses such as hydrodenitrification, cracking, hydrocracking, there is no mention of NO_x reduction or even the potential need to reduce NO_x gases. Applicant does not believe that the broad disclosure of hydrodenitrification is directed to a NO_x reduction component.

The Applicant's argument is not persuasive because Aubert discloses, "Multifunctional catalysts is understood to means catalysts capable of carrying out not only oxidation, in particular of carbon monoxide and hydrocarbons present in exhaust gases, but also reduction, in particularly of nitrogen oxides also present in these gases ("three-way" catalysts). Zirconium oxide and cerium oxide today appear as two particularly important and advantages constituents in this type of catalyst." (Column 1, lines 10-17). Clearly, mixed zirconium and cerium oxide is a suitable catalyst for NO_x reduction. Aubert also discloses that this catalyst can be used in various processes including hydrodenitrification, cracking, and hydrocracking (See column 7, lines 50-57). Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Peters invention by using the mixed zirconium and cerium oxide catalyst disclosed in Aubert invention to reduce NO_x emission in the in the FCC process of Peters.

21. The Applicant argues that nowhere in Aubert et al. is the use of the mixed oxide of cerium and zirconium disclosed as a NO_x reduction component in combination with

an FCC catalyst. Therefore, it is Applicant's position that one of skill in the art would not be motivated to combine the mixed oxide of cerium and zirconium of Aubert et al. with the FCC catalyst of Peters et al., or reasonably expect such a combination to work for the intended purpose, NO_x reduction in an FCC process, without direction from Applicant's disclosure.

The Applicant's argument is not persuasive because Aubert does disclose use of mixed zirconium and cerium oxide as a catalyst for NO_x reduction as mentioned earlier. Further, Peters clearly discloses use of ceria as the NO_x reduction component (See Peters: column 2, lines 47-50) and Aubert discloses that zirconium oxide and cerium oxide are particularly important for reducing nitrogen oxide and it is often advantageous to use these catalysts in the form of mixed oxides (See Aubert: column 1, lines 8-20). Thus, the use of zirconium and cerium oxide alone or mixed would be expected to be effective NO_x reducing agents.

22. With regard to the nonstatutory obviousness-type double patenting rejection the Applicant argues that '298 patent does not teach or suggest the use of mixed oxide of cerium and zirconium would work in the NO_x reduction component.

The Applicant's argument is not persuasive because both zirconium oxide and cerium oxide are known for NO_x reduction and therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the claim of patent '298 to use zirconium and cerium oxides mixed together for enhanced NO_x reduction.

Conclusion

23. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prem C. Singh whose telephone number is 571-272-6381. The examiner can normally be reached on MF 7:00 AM-3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1764

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PS/061907



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